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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
DIVISION OF AGRICULTURAL ENGINEERING

S. H. McCrory, Chief

MONTHLY NEWS LETTER

WASHINGTON, D. C., November 20, 1928

MR. McCRORY SPENT NOVEMBER 12 AND 13 IN TOLEDO CONFERRING WITH THE TOLEDO ENGINEERS AND VIEWING THE PROGRESS OF THE WORK. SUCH WORK CONSISTED OF THE PLOWING PROJECT WHERE 30 PLOWS ARE BEING TESTED UNDER THE DIRECTION OF WALLACE ASHBY ASSISTED BY THAYER CLEAVER, THE STATIONARY LOW-CUTTING ATTACHMENT DEVISED FOR THE OSBORNE BINDER BY FRANK IRONS, A PRELIMINARY TRIAL OF THE STALK PICK-UP MACHINE DESIGNED AND BUILT BY R. T. CHALLENGER, THE MOBILE BURNER REBUILT AND BEING TESTED BY O. K. HEDDEN, AND THE COMBINATION CORN PICKER-SHREDDER BUILT BY THE JOHN DEERE COMPANY.

FROM TOLEDO MR. McCRORY PROCEEDED TO ST. PAUL FOR CONFERENCES WITH D. G. MILLER AND THE UNIVERSITY AUTHORITIES WITH REGARD TO COOPERATIVE WORK IN PROGRESS. HE THEN HAD A CONFERENCE WITH PROFESSOR J. B. DAVIDSON AND OTHERS AT AMES, IOWA; WITH D. L. YARNELL, AT IOWA CITY; J. G. SUTTON, AT QUINCY, ILL.; AND R. L. NORTON, AT CHICAGO; WITH REGARD TO WORK IN PROGRESS OR CONTEMPLATED. MR. McCRORY IS EXPECTED TO RETURN TO WASHINGTON ON NOVEMBER 21.

UNDER THE PROVISIONS OF P.B.A. CIRCULAR No. 97, ALL BUREAUS OF THE DEPARTMENT OF AGRICULTURE ARE INVITED TO PUT UP TO THIS DIVISION THEIR PROBLEMS LYING IN THE FIELD OF ENGINEERING. AS A RESULT, SERVICE WORK OF THIS CHARACTER HAS BEEN HEAVY SINCE JULY 1 AND IS INCREASING. CHIEFLY, THE PROBLEMS ARE THOSE INVOLVED IN BUILDINGS AND EQUIPMENT TO BE USED FOR RESEARCH WORK BY THE VARIOUS BUREAUS, AND INCLUDE BUILDING CONSTRUCTION, HEATING, VENTILATION, AND ACCURATE TEMPERATURE AND HUMIDITY CONTROL. EQUIPMENT PROBLEMS INVOLVE MECHANICAL ENGINEERING, ELECTRICAL ENGINEERING, THERMODYNAMICS; IN FACT THERE ARE FEW PHASES OF ENGINEERING THAT HAVE NOT ALREADY BEEN DEALT WITH IN SERVICE SO FAR RENDERED. AMONG THE IMPORTANT JOBS OUR ENGINEERS HAVE HANDLED ARE: THE CONSTRUCTION OF A \$25,000 BEEF CATTLE BARN FOR THE BUREAU OF ANIMAL INDUSTRY, AT BELTSVILLE, MD.; AN ABBATOIR FOR THE BUREAU OF ANIMAL INDUSTRY, AT BELTSVILLE; A HEATING, PLUMBING, AND ELECTRIC LIGHTING LAYOUT FOR THE BUREAU OF FISHERIES' MARINE BIOLOGICAL STATION, BEAUFORT, N. C.; PREPARATION OF SPECIFICATIONS FOR INSTALLING NEW EQUIPMENT IN THE NEW YORK CITY LABORATORY OF FOOD, DRUG AND INSECTICIDE ADMINISTRATION; DEVELOPMENT OF SUITABLE EQUIPMENT FOR HIGH-PRESSURE SPRAYING AGAINST THE GYPSY MOTH IN NEW ENGLAND. THE DIVISION IS AUTHORIZED TO RENDER BILLS AGAINST THE BUREAUS CONCERNED FOR TIME SPENT AND EXPENSES INCURRED IN CONNECTION WITH SUCH SERVICE WORK.

J. C. MARR HAS SENT THE FOLLOWING NOTES CONCERNING DRAINAGE BY PUMPING FROM WELLS IN THE PIONEER IRRIGATION DISTRICT IN IDAHO WHICH, HE REPORTS, IS PROVING HIGHLY SATISFACTORY.



1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

SOME YEARS AGO THIS DISTRICT EXCAVATED A GRAVITY DRAINAGE SYSTEM FOR ITS ENTIRE CULTIVATED AREA OF 30,000 ACRES. WITHIN THE PAST FEW YEARS IT HAS BECOME APPARENT THAT THE DRAINAGE THUS AFFORDED WAS INADEQUATE. TWO YEARS AGO THE DISTRICT INSTALLED AS AN EXPERIMENT ONE LARGE DRAINAGE WELL AND PUMPING PLANT AND DURING 1928 THREE MORE HAVE BEEN UNDER CONSTRUCTION. TWO OF THESE HAVE BEEN OPERATED A SUFFICIENT LENGTH OF TIME TO PROVE THEIR WORTH AND BECAUSE OF THE SUCCESS MET, A BOND ELECTION WILL BE HELD IN THE NEAR FUTURE LOOKING TO THE CONSTRUCTION OF FROM 18 TO 20 MORE OF THESE DRAINAGE UNITS WHICH IT IS ESTIMATED WILL COST \$100,000. AN ADDITIONAL WATER SUPPLY, AS WELL AS MORE EFFICIENT DRAINAGE, IS THE AIM OF THE PIONEER IRRIGATION DISTRICT. THE OUTSTANDING FACTS IN CONNECTION WITH THE TWO DRAINAGE UNITS WHICH ARE COMPLETED AND IN OPERATION ARE AS FOLLOWS:

DRAINAGE UNIT No. 1 -

TYPE OF WELL - GRAVEL WALL-LAYNE SHUTTER SCREEN  
 SIZE OF WELL - 38" DIAMETER FOR 88'; 18" DIAMETER FOR 47'; DEPTH 135'.  
 PUMP - LAYNE & BOWLER 18" DEEP WELL TURBINE.  
 MOTOR - 40 HORSEPOWER - GENERAL ELECTRIC.  
 TOTAL LIFT - 37 FEET.  
 DISCHARGE - 292 MINERS INCHES, OR 5.82 SEC. FEET.  
 TOTAL COST OF INSTALLATION - \$8,500.00  
 TOTAL PRODUCTION IN 1928 FOR 5 MONTHS - 1,750 ACRE FEET.  
 COST PER ACRE-FOOT FOR PUMPING - 60 CENTS.  
 AREA DRAINED - APPROXIMATELY 1,100 ACRES.

DRAINAGE UNIT No. 4 -

TYPE OF WELL - CALIFORNIA STOVE PIPE - PERFORATED.  
 SIZE OF WELL - 18 INCHES.  
 DEPTH OF WELL - 132 FEET.  
 PUMP - LAYNE & BOWLER 18" DEEP WELL TURBINE.  
 MOTOR - 40 HORSEPOWER, GENERAL ELECTRIC.  
 TOTAL LIFT - 45 FEET.  
 DISCHARGE - 221 MINERS INCHES, OR 4.42 SEC. FEET.  
 TOTAL COST OF INSTALLATION - \$3,900.00.  
 TOTAL ESTIMATED PRODUCTION FOR 5 MONTHS - 1,326 ACRE FEET.  
 COST PER ACRE FOOT FOR PUMPING - 71 CENTS.  
 AREA DRAINED - APPROXIMATELY 700 ACRES.

R. B. GRAY LEFT TOLEDO OCTOBER 17 BY AUTO ON A THREE-WEEKS' TRIP THROUGH THE NEW ENGLAND STATES AND INTERMEDIATE POINTS TO OBSERVE CONDITIONS AND CONFER ON CLEAN PLOWING AND OTHER MEASURES AS A MEANS OF CONTROLLING THE CORN BORER IN THE NEW ENGLAND OR TWO-GENERATION AREA. EN ROUTE HE CONFERRED WITH OFFICIALS OF THE NEW IDEA SPREADER COMPANY AT COLDWATER, OHIO; SPENT ONE DAY AT THE WASHINGTON OFFICE; AND ON THE RETURN TRIP CONFERRED WITH OFFICIALS OF THE MASSEY-HARRIS HARVESTER COMPANY AT BATAVIA, N. Y. HE REPORTS HEAVY INFESTATIONS, PARTICULARLY IN RHODE ISLAND AND MASSACHUSETTS WHERE THE BORER ATTACKS NOT ONLY THE SWEET AND FIELD CORN, BUT PEPPERS, POTATOES, BEANS, BEET TOPS, CHRYSANTHEMUMS AND MANY OTHER PLANTS WITH PITHY STEMS.



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MR. KRANICH, OF THE J. I. CASE THRESHING MACHINE COMPANY, CONFERRED OCTOBER 31 AT TOLEDO WITH R. M. MERRILL ON THE STATIONARY LOW-CUTTING ATTACHMENT RECENTLY DEVELOPED BY THE TOLEDO ENGINEERS FOR THE OSBORNE CORN BINDER BUILT BY THAT COMPANY. THE MACHINE WAS DEMONSTRATED AND MR. MERRILL REPORTS VERY SATISFACTORY PERFORMANCE.

THE SHREDDER PROJECT STARTED UP NOVEMBER 14 UNDER THE DIRECTION OF I. F. REED ASSISTED BY W. R. HUMPHRIES. FIVE NEW MACHINES OF DIFFERENT MAKES ARE TO BE TESTED AS WELL AS SOME TEN FARMER-OWNED MACHINES.

THE FOLLOWING APPOINTMENTS HAVE BECOME EFFECTIVE SINCE THE LAST ISSUE OF THE NEWS LETTER:

F. D. FULTON, OF WISCONSIN, AS ASSISTANT AGRICULTURAL ENGINEER, FOR SERVICE ON THE CORN BORER PROJECT AT TOLEDO, EFFECTIVE NOVEMBER 1.

ELI J. SAX, OF MASSACHUSETTS, AS JUNIOR AGRICULTURAL ENGINEER, FOR SERVICE ON THE CORN BORER INVESTIGATIONS AT TOLEDO, EFFECTIVE NOVEMBER 16.

PAUL D. HOPKINS, OF TEXAS, AS JUNIOR CIVIL ENGINEER, FOR SERVICE AT IOWA CITY ASSISTING MR. YARNELL ON THE HYDRAULIC INVESTIGATIONS, EFFECTIVE NOV. 12.

GEORGE R. BOYD, WHO AS REPORTED IN THE LAST ISSUE IS DIRECTING COOPERATIVE LAND CLEARING INVESTIGATIONS IN MINNESOTA, REPORTS THAT THEY HAVE HAD AN UNUSUALLY FAVORABLE FALL FOR THIS WORK. NO SNOW OF CONSEQUENCE HAD YET FALLEN. THE WORK IN WHICH MR. BOYD IS ENGAGED INCLUDES THE COMPARISON OF VARIOUS METHODS OF LAND CLEARING UNDER DIFFERENT CONDITIONS, INCLUDING BLASTING, POWER PULLING, GRUBBING, AND BURNING. IT IS EXPECTED THAT THIS SEASON'S WORK WILL BE COMPLETED ABOUT NOVEMBER 25 BUT WILL BE CONTINUED NEXT SPRING.

A LIBRARIAN FOR OUR DIVISION HAS BEEN AUTHORIZED. A ROOM HAS BEEN EQUIPPED FOR THIS PURPOSE WITH UP-TO-DATE STEEL LIBRARY BOOKCASE UNITS, AND IT IS HOPED THAT THE LIBRARIAN WILL BE AVAILABLE SHORTLY. THIS APPOINTMENT WILL FACILITATE GREATLY OUR HANDLING OF BOOKS, MAGAZINES, AND PERIODICALS, AND THE CATALOGUING OF REFERENCE INFORMATION.

G. A. CUMINGS WHO IN THE LAST ISSUE WAS REPORTED AS BEING ON AN EXTENSIVE TRIP THROUGH THE WEST, MAKING A PRELIMINARY STUDY OF MACHINERY USED IN BEET SUGAR PRODUCTION, REPORTS GRATIFYING SUCCESS IN SECURING THE INFORMATION WANTED AND IN ENLISTING COOPERATION FOR PROPOSED FUTURE WORK ON THE PART OF BEET SUGAR GROWERS AND PROCESSERS. THERE IS A FIELD HERE FOR SOME VERY USEFUL WORK DIRECTED TOWARD DEVELOPING MACHINERY TO TAKE THE PLACE, TO A CONSIDERABLE EXTENT, OF LOW-GRADE LABOR.

THIS DIVISION IS PARTICIPATING EXTENSIVELY THIS YEAR IN THE DEPARTMENT'S RADIO PROGRAM. VARIOUS ENGINEERS HAVE PREPARED TALKS RANGING FROM 50 TO 1,000 WORDS AND CLASSED UNDER THE HEAD OF "FARM FORUM", "FARM FLASHES", "HOUSEHOLDERS CHATS", ETC. L. A. JONES RECENTLY GAVE A TALK ON TERRACING, FROM A WASHINGTON RADIO STATION THAT WAS DISTRIBUTED OVER







18 STATIONS THROUGHOUT THE CENTRAL WEST AND SOUTH. IT IS PROBABLE THAT OTHERS OF OUR ENGINEERS WILL HAVE OPPORTUNITY TO TALK ON THEIR RESPECTIVE SUBJECTS.

A. H. SENNER HAS RECENTLY COMPLETED PLANS FOR HEATING, PLUMBING, AND ELECTRIC LIGHTING FOR THE BUREAU OF FISHERIES MARINE BIOLOGICAL STATION AT BEAUFORT, N. C. ABOUT 50 PER CENT OF THE CONSTRUCTION WORK HAS BEEN COMPLETED. THIS STATION IS THE CENTER OF THE RESEARCH WORK OF THE BUREAU OF FISHERIES FOR THE SOUTHEASTERN PART OF THE COUNTRY. MR. SENNER HAS ALSO PRACTICALLY COMPLETED HEATING AND PLUMBING PLANS FOR THE FORT VALLEY, GEORGIA STATION OF THE BUREAU OF PLANT INDUSTRY. AT THIS STATION THE BUREAU OF PLANT INDUSTRY IS STUDYING THE PEACH TREE MENACE KNOWN AS THE "PHONY" DISEASE.

ON THE EVENING OF NOVEMBER 22, A. H. SENNER WILL ADDRESS A GATHERING AT THE COSMOS CLUB AT WASHINGTON ON THE SUBJECT OF AUTOMATIC HOUSE HEATING WITH GAS AND OIL.

DURING THE PAST SUMMER W. M. HURST ASSISTED IN AN EXPERIMENT IN GRAIN DRYING IN COOPERATION WITH THE NORTH DAKOTA EXPERIMENT STATION. THE APPARATUS USED IN THE TEST CONSISTED OF A BOX 18 x 48 x 72 INCHES IN DIMENSIONS, SUPPORTED BY CORNER POSTS AND WITH A HOPPER AT THE TOP. TWO OPPOSITE SIDES OF THE BOX WERE OPEN, THE OTHER SIDES BEING PRACTICALLY AIR TIGHT. SCREEN WIRE FRAMES, TWO ON EACH SIDE, SPACED 6 INCHES APART, WERE SUPPORTED IN A VERTICAL POSITION ACROSS THE OPEN SIDES OF THE BOX TO HOLD THE GRAIN IN VERTICAL LAYERS.

HEATED AIR WAS BLOWN INTO THE BOX FROM BENEATH BY A SIROCCO FAN AND FORCED THROUGH THE 6-INCH LAYERS OF GRAIN. THE DRYING AIR WAS HEATED BY AN ELECTRIC HEATER MADE UP OF FORTY-EIGHT 300-WATT ELEMENTS INCLOSED IN AN INSULATED BOX. THE AIR PASSED THROUGH 14 FEET OF 6-INCH PIPE TO THE HEATER BOX FROM WHICH IT PASSED INTO THE DRYER THROUGH AN ELBOW IN THE BOTTOM OF THE BOX.

AIR MEASUREMENTS WERE TAKEN WITH A PITOT TUBE AT THE CENTER OF A 6-INCH PIPE AND WATT-HOUR METERS REGISTERED THE ENERGY REQUIRED TO OPERATE THE FAN AND HEATER.

THE WHEAT FOR THESE TESTS CONTAINED BETWEEN 18 AND 19 PER CENT MOISTURE. THREE TESTS AT DIFFERENT AIR VELOCITIES WERE MADE AT A TEMPERATURE OF 120° F., AND SIMILAR TESTS AT 140° AND 160° F., MAKING A TOTAL OF NINE TESTS. THE RESULTS SHOW THAT THE WHEAT WAS REDUCED FROM 18 TO 14 PER CENT IN MOISTURE CONTENT IN 40 TO 80 MINUTES, DEPENDING LARGELY UPON THE RATE AT WHICH HEAT WAS SUPPLIED. IT SEEMED APPARENT THAT IT MADE LITTLE DIFFERENCE WHETHER A LARGE QUANTITY OF AIR WAS SUPPLIED AT 120° F. OR A SMALL QUANTITY AT 160° F. SO FAR AS THE TOTAL NUMBER OF HEAT UNITS ARE CONCERNED. UNDER TEST CONDITIONS THE HEAT REQUIRED FOR DRYING ONE BUSHEL OF WHEAT WAS EQUIVALENT TO 1 POUND OF COAL AT 100 PER CENT EFFICIENCY OR ABOUT 2 POUNDS OF COAL PER BUSHEL OF WHEAT AT 50 PER CENT EFFICIENCY.

